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(54) **Magnetic Fastener**

(57) The invention pertains to a magnetic fastener for a removable connection of magnetizable components (10, 12) such as presentation and product carriers, shelf parts, hooks, lights, pictures and such, with at least one permanent magnet (14) as a double sided fastener between two components (10, 12). In order to improve the fastening effectiveness, especially under shear loads, it is recommended that a bar-shaped magnet (14) has an elastic adhesive layer (20) on each opposite facing pole surface (18) in order to increase the frictional contact to the component.

Description

[0001] The invention pertains to a magnetic fastener for a removable connection of magnetizable components such as presentation and product carriers, shelf parts, hooks, lights, pictures and such to at least one permanently magnetic connecting magnet as a double sided connecting material between two components.

[0002] Magnetic fasteners are known in various applications, for example, in order to simply place and remove utensils on fastening surfaces attached to a wall. The permanent magnets utilized generally have a high adhesion perpendicular to the pole surface, but can be easily moved by shear forces.

[0003] Resulting from this, the invention has the objective to improve the double-sided magnetic fastener such that a reliable fastening can be guaranteed while having a simple and flexible means of manufacturing.

[0004] To solve this objective the combination of characteristics in Claim 1 are proposed. Advantageous applications and further development of the invention can be found in the dependant claims.

[0005] Pursuant to the invention, it is proposed that the magnet contains an adhesive layer on its opposite poles in order to increase the frictional contact to the components. Through this, a further adhesive friction is achieved on the contact surfaces in order to avoid an undesirable relative movement of the connecting components. Through this, a component made from numerous individual components can be quickly and flexibly created with minimal handling.

[0006] A further improvement of the fastening can be achieved by making the adhesive layer out of a preferably elastic formable plastic material. It is especially advantageous when the adhesive layer is made of a permanently elastic and solvent-free anti-slip layer that has an adhesive effect between the pole surface and the connecting surface of the component to be fastened. The sticky layer can especially be made of preferably a dried adhesive with some residual adhesive value. An alternative, advantageous application foresees that the sticky layer is made of an elastomer material that covers the pole surfaces, especial a natural or synthetic resin.

[0007] In order to achieve a high magnetic attraction or fastening force respectively, it is advantageous that the magnet is made of a rare earth alloy as the magnetic component.

A further improvement is achieved in that the magnet is surrounded by a magnetizable metal sheath. Preferably a between-layer made of a non-magnetic material is situated between the magnet and the metal sheath, or the between layer is kept as an empty air layer. In order to securely achieve a magnetic reflux[1] between the components, it is advantageous when the metal sheath is flush with the magnet on its front side or is axially situated farther back in the area of the sticky layer.

[0008] A further advantageous application of the invention foresees an elastic anti-slip part, preferably made of plastic which can be clamped in between the components, spread out sideways from the magnet. Through this an improvement in the adhesion during shear stress is achieved. Through this it is advantageous when the anti-slip part is longer than the magnet in the direction of the connection as seen from between the components, such that the anti-slip part is firmly held between the components through the force of the magnet.

[0009] The magnet is advantageously designed flat with a rectangular or cylindrical cross section axially between the pole surfaces.

[0010] When the connection is detached it is frequently desired that the fastener remains attached to a defined connection partner. In order to accomplish this, a preferred application foresees that the magnet has an outwardrly convex adhesive layer on one pole end and a flat connection surface on the other pole surface.

[0011] The adhesion layer of the magnet preferably has a thickness between 0.05 and 0.2 mm.

[0012] For fastening components with large surfaces or high loads it is advantageous that a number of magnets and, if necessary, anti-slip parts are situated spaced apart from one another as point connections between the components.

[0013] The invention is further described in the following passage via the application examples depicted schematically in the drawings.

Fig. 1 shows in a partially cross-sectioned side view, a magnetic fastener for a removable connection of plate shaped components.

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[1] magnetic reflux: Original "magnetischer Rueckschluss" can be literally translated to "magnetic inference"

Fig. 2 shows a further application example of a magnetic fastener with a convex coating of the magnet in a vertical view.

Fig. 3 and 4 show in a frontal view, a magnetic fastener in a sheath with a round and rectangular contour.

Fig. 5 and 6 show in a side and frontal view, a magnetic fastener with hooks.

Fig. 7 and 8 show in a side and frontal view, a further application form with several magnets for holding a hook strip.

[0014] The magnetic fastener shown in the drawing serves the purpose of being a removable connection for magnetizable, light magnetic components 10, 12 and contains for this purpose at least one permanently magnetic bar magnet 14 as well as, if needed, one or more anti-slip parts 16 belonging to the magnet.

[0015] The magnet 14 shown in Fig.1 is depicted as a flat round magnet that has an adhesive layer 20 on each of its opposite situated pole surfaces 18 for increasing the frictional connection between the connecting surfaces 22 of the magnetizable plate-shaped components 10, 12. The adhesive layer 20 exists to achieve a high frictional coeeficient from a elastically deformable plastic material. Preferably foreseen is an adhesive layer 20 that is cured or dried and thus solvent free that gives a residual adhesive force at the connection surfaces 22 in addition to the magnetic force. Generally, it is also possible to make the adhesive layer 20 out of a rubber material, especially for protecting sensitive connecting surfaces.

[0016] A rare earth cobalt alloy is used to obtain an especially high coercive field strength. In the design described here, the round magnet 14 can have a length of 3 mm between the pole surfaces 18 and a diameter of 15 mm, while the adhesive layers 20 have a layer thickness of 0.15 mm each.

[0017] The anti-slip part 16 spaced apart and situated on the side of the magnet 14 is also plate shaped and is made of an elastic plastic material. It is axially slightly longer than the magnet 14. Through this, the anti-slip part 16 is firmly held between the parallel held components 10, 12, such that an undesired sliding of the components 10, 12 perpendicular to the direction of the connection is further made more difficult.

[0018] In Fig. 2, an angulated hanging track is shown as a connecting component 10, which is able to be magnetically fastened to a counter-fastening wall not shown here.

The magnet 14 has a flat adhesive layer 20 on the interface to the hanging track 10 and an outwardly convex adhesive layer 20' on its opposite pole surface at the interface to the counter fastening wall. Through this measure it is ensured when the fastener is removed, the magnet 14 stays attached to the hanging track 10 through the better fastening force.

[0019] In the application examples shown in Fig. 3 and 4, the magnet or bar magnet 14 is covered by a magnetizable metal sheath 24. Between the magnet 14 and the metal sheath there is an in-between layer made of plastic foreseen as a non-magnetizable gap holder. A magnetic reflux between the components 10, 12 is achieved by the metallic sheath 24 such that the fastening force is significantly increased. Such an application, as shown in Fig. 5 and 6, can serve as a fastener for a hook 10 on a metal wall 12, whereby the high fastening strength gives the hook a large carrying weight and simultaneously a simple means of frequently changing the location of the hook.

[0020] As shown in Fig. 7 and 8, many magnets 14 and accompanying anti-slip parts 16 can also be used as point specific means of connection, for a removable fastening of larger components, for example a full hook or coat rack 10 onto a metal wall 12.

[0021] An especially preferred application of the magnet arrangement pursuant to the invention is the quick and flexible construction of presentation and product shelving fixtures in the commercial and trade show industries.

Claims

1. Magnetic fastener for a removable fastening of magnetizable components (10, 12), such as presentation and product fixtures, shelving parts, hooks, lights, pictures and such, with at least one permanent magnet (14) as a double sided connection medium between two components (10, 12), wherein the bar shaped magnet 14 has an adhesive layer (20) on each of its opposite situated pole surfaces (18) for increasing the frictional connection to the component (10, 12).

2. Magnetic fastener of Claim 1, wherein the adhesive layer (20) is composed of a preferably elastic deformable plastic material.

3. Magnetic fastener of either Claim 1 or 2, wherein the adhesive layer (20) is composed of a permanently elastic and solvent free anti-slip layer with adhesive force between the pole surface (18) and the connection surface (22) of each of the components (10, 12) to be connected.

4. Magnetic fastener of either Claim 1 to 3, wherein the adhesive layer (20) is composed of a preferably dried adhesive that at least has a residual adhesive effect.

5. Magnetic fastener of either Claim 1 to 3, wherein the adhesive layer (20) is composed of an elastomer material, especially natural or synthetic resin, that covers the pole surfaces (18).

6. Magnetic fastener of either Claim 1 to 5, wherein the magnet (14) is composed of a rare earth alloy as its magnetic material.

7. Magnetic fastener of either Claim 1 to 6, wherein the magnet (14) is covered by a magnetizable metal sheath (24) while retaining a gap in between them.

8. Magnetic fastener of either Claim 1 to 7, wherein an in-between layer (26) of a non-magnetic material or an empty air gap is situated in between the magnet 14 and the metal sheath 24.

9. Magnetic fastener of either Claim 7 or 8, wherein the metal sheath (24) covers the magnet 14 at its front side or is axially set farther back in the area of the adhesive layer (20).

10. Magnetic fastener of either Claim 1 to 9, wherein it has at least one elastic anti-slip part (16), preferably made of plastic which can be clamped in between the components (10, 12) spaced apart from the magnet (14).

11. Magnetic fastener of Claim 10, wherein the anti-slip piece (16) is longer than the magnet (14) with respect to the direction of the connection between the two components (10, 12), such that the anti-slip part (16) is firmly held between the components (10, 12) due to the attractive force of the magnet.

12. Magnetic fastener of either Claim 1 to 11, wherein the magnet (14) is designed to be flat with a rectangular or cylindrical cross section axially between the pole surfaces (18).

13. Magnetic fastener of either Claim 1 to 12, wherein the magnet (14) has a outwardly convex adhesive layer 20' on one pole surface (18) and a frontally flat adhesive layer (20) on the other pole surface (18).

14 Magnetic fastener of either Claim 1 to 13, wherein the thickness of the adhesive layer (20) of the magnet (14) is between 0.05 and 0.2 mm.

15. Magnetic fastener of either Claim 1 to 14, wherein many magnets (14) and, if necessary, anti-slip parts (16) are situated between the components (10, 12), spaced apart from each other as point specific connectors.

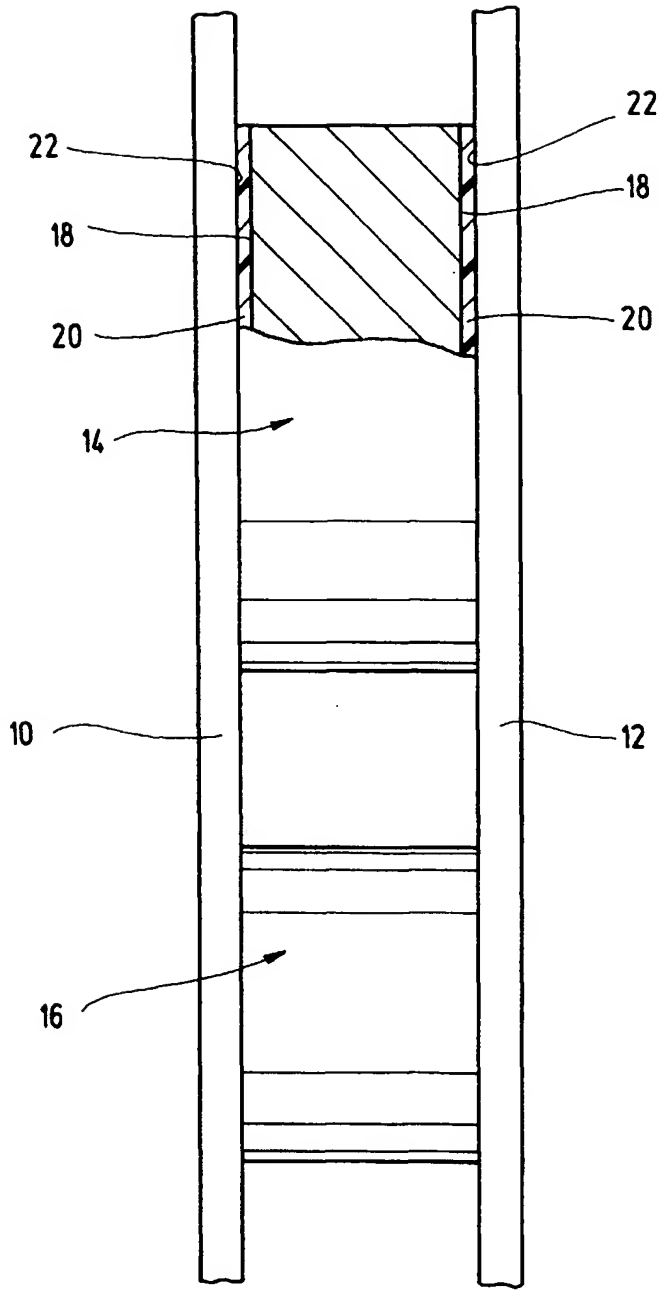

Fig.1

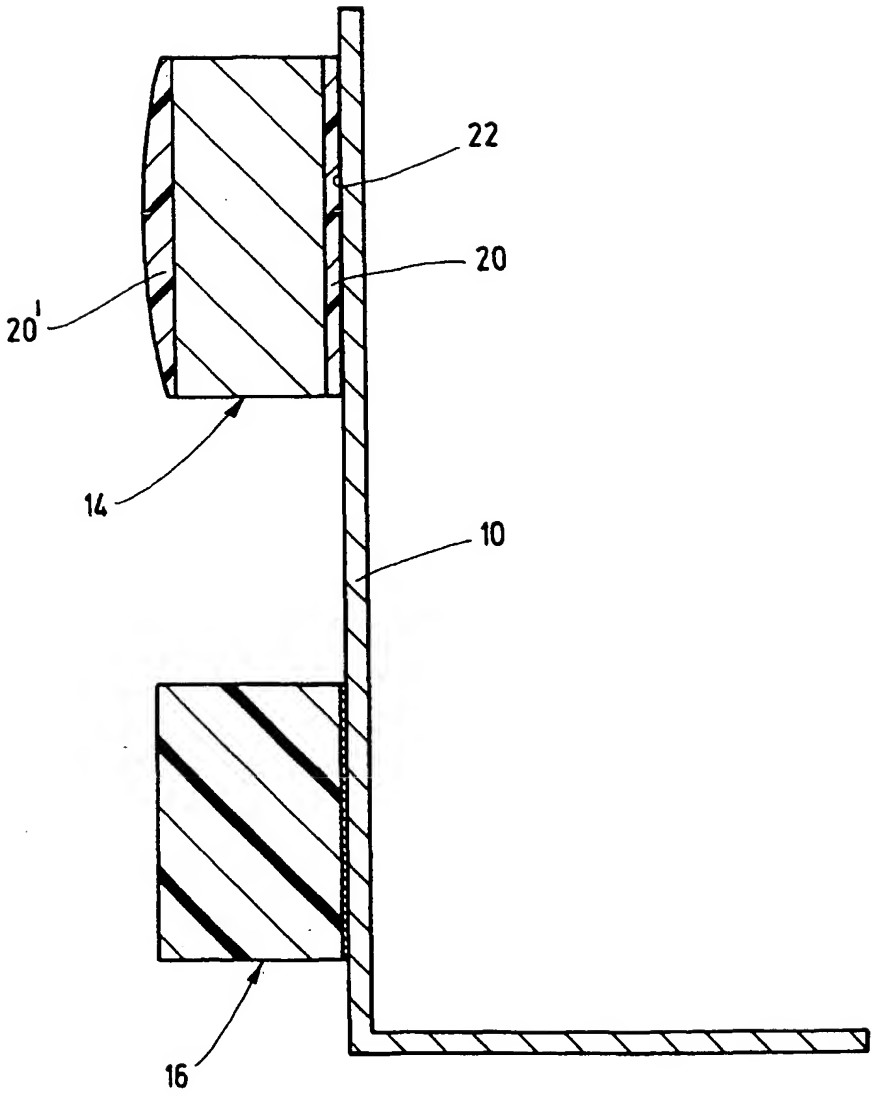

Fig.2

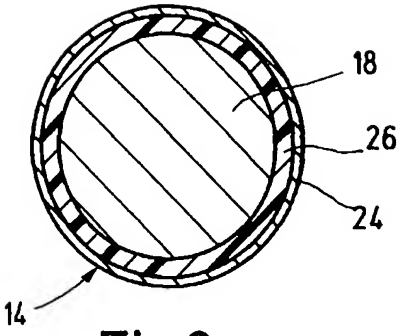

Fig.3

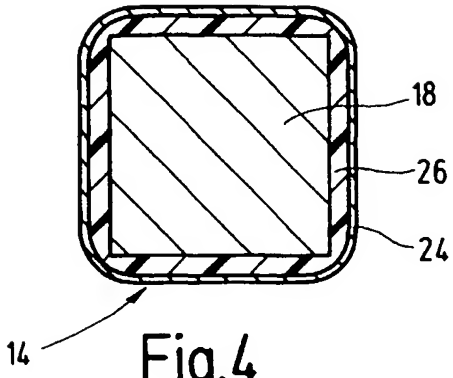

Fig.4

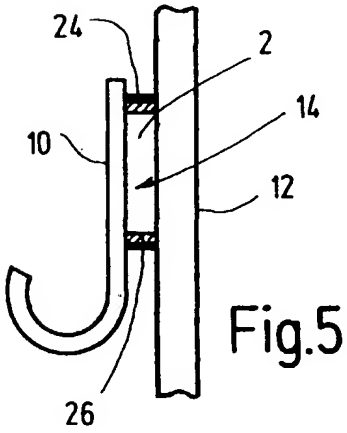

Fig.5

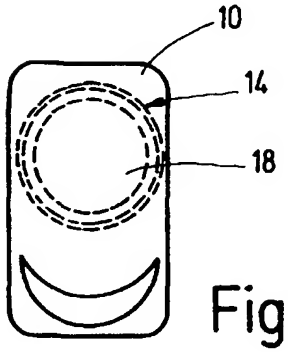

Fig.6

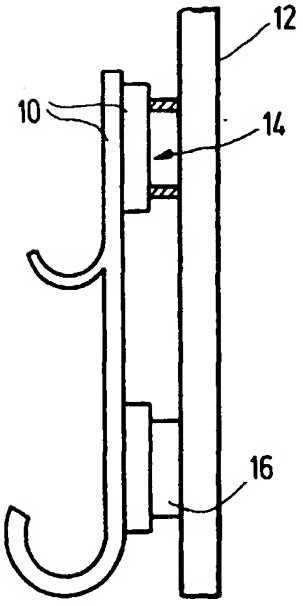

Fig.7

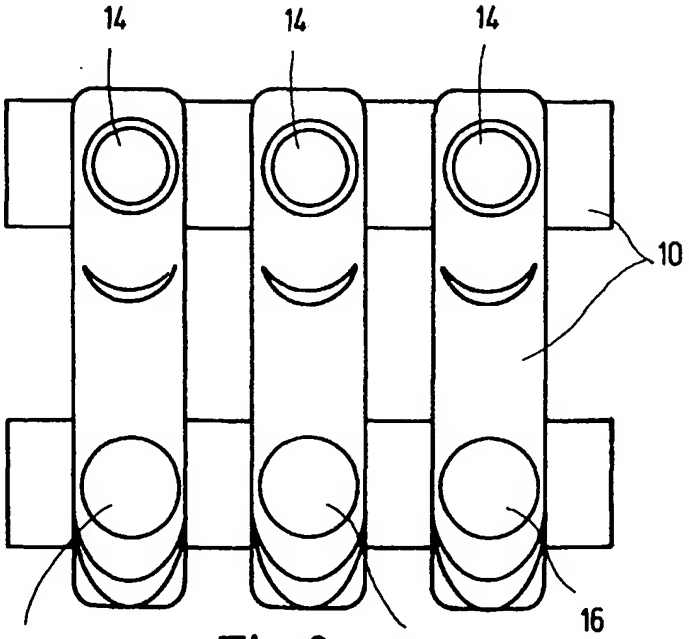

Fig.8